

A CONTRIBUTION TO THE ECOLOGY OF THE ADULT HOATZIN.

Ecology of the Hoatzin.

PART I—INTRODUCTION.

PART II—HISTORY.

PART III—NAME.

PART IV—DISTRIBUTION.

PART V—GENERAL APPEARANCE.

PART VI—PARASITES.

PART VII—FIELD NOTES IN VENEZUELA.

PART VIII—FIELD NOTES IN BRITISH GUIANA.

PART IX—FOOD.

PART X—NEST AND EGGS.

PART XI—ENEMIES.

PART XII—PHOTOGRAPHING HOATZINS.

PART XIII—ODOR.

PART I—INTRODUCTION.

The strangeness of life and structure of this bird have made it classic in the annals of ornithology, and because of this claim upon our interest I offer the present article as a résumé of our present knowledge of the habits of the adult Hoatzin. We are still ignorant of a considerable part of its life history, although there is small excuse for this, as the bird is sedentary, abundant wherever found, and tame to an absurd degree.

I have had two brief opportunities for observing this species in life, once in March, 1908, on the Guarapiche River in north-eastern Venezuela, and again in April, 1909, on the Abary River, British Guiana. On neither occasion were young birds to be found, so my notes refer solely to the adults.

Although it is not my intention to discuss the anatomy of the Hoatzin, mention may be made of certain peculiarities, which exert an important influence upon its habits and activities.

The crop of this bird is unique in having assumed the structure and importance of the gizzard in other birds. It has increased greatly in size, measuring, when well filled with food, about two and a half inches in diameter. The walls, instead of

being flabby and glandular, are thick and muscular. This increase in the size of an organ situated far forward in the body has resulted in a reduction of the front part of the keel of the sternum, a condition unique among birds. In reducing the area of attachment for the pectoral muscles, this change has radically affected the power of flight.

In spite of this specialization, there is no doubt that the Hoatzin is an extremely ancient and isolated type, and it has very properly been set aside in a separate Order by itself—Opisthocomiformes (43). Combining, as it does, the characters of several Orders, it is impossible to indicate its correct position in a linear classification. In such artificial, two-plane, genealogical trees, it has been variously placed between the game birds and the rails; between the pigeons and the rails; while it has certain affinities with the plantain-eaters, and the vestigial claw on the third digit links it with the primitive Archaeopteryx.

Another claim to a primitive condition is found in the quadrupedal habits of the young. These, by means of unusually developed fore limb and fingers, and external claws on the first and second fingers, are able to climb actively about the bushes. They also swim and dive well.

PART II—HISTORY.

More than two hundred and fifty years ago Hernandez, in his *Nova Plantarum, Animalium et Mineralium Mexicanorum Historia* (22), makes the first authentic mention of the Hoatzin, writing in Latin as follows:

“The Hoatzin,—a bird uttering a curious note, sounding like its name.

“This is a bird of about the size of an Indian fowl. Its beak is curved; its breast shades from white to buff; its wings and tail are spotted with white at intervals of a thumb’s length; the back of the upper part of its neck is yellow, shading into blackish on both sides and sometimes extending as far as the beak and eyes; the claws are black and the legs blackish. The bird bears a sturdy crest of feathers, varying from white to yellowish, the back of each feather, however, being black. The bird subsists upon snakes. It has a powerful voice which resembles a howling or wailing sound. It is heard in the autumn and is held inauspicious by the natives.

“The bones of this bird relieve the pain of wounds in any part of the human body; the odor of the plumage restores hope to those who, from disease, are steadily wasting away. The ashes



FIG. 7. Breast-bone of Hoatzin.

of the feathers when devoured relieve the Gallic sickness, acting in a wonderful manner.

"The bird lives in warm regions, such as Yauhtepeucis, generally establishing itself in trees growing along the banks of the streams, where we, having observed it, captured it, and making a drawing of it, kept it alive."

With the exception of the description, which is fairly accurate, this quotation is interesting chiefly because of its characteristically medieval superstition.

One hundred years after the account of Hernandez, Brisson (11) wrote a vague and plagiarized description of the New World bird which he called Le Hocco Brun de Mexique (*Crax fuscus mexicanus*). He said:

"It is nearly as large as a female Turkey. Its head bears a crest composed of feathers which are yellowish-white above and black below. The sides of the head, the upper part of the neck and back are reddish-brown. The breast is yellowish-white. The wings and tail are varied with white and yellow, and that by spots of a thumb's length. The feet are brown; and the claws black. It feeds on serpents. It is found in Mexico, and chiefly in the hottest parts. It perches on the trees which are found along the rivers."

The final sentence is admirable; but as the bird is a vegetarian and is not found in Mexico, and as Brisson seemed rather color blind, little can be said as to the remainder of the quotation, which I offer merely from the interest attaching to very early accounts.

As in the above instance, the inaccuracies of the pioneer ornithologist Hernandez have been repeated, and, indeed, enlarged upon by succeeding authors. Thus Latham (26) twenty-three years later, informs us that the "Crested Pheasant" inhabits "Mexico and parts adjacent, where it feeds on snakes; makes a howling kind of noise, and is found in trees near rivers; is accounted an unlucky bird. Met with chiefly in the autumn, and is said to pronounce a sound not unlike the word 'Hoactzin.' We learn from others that it may be domesticated, and is seen in that state among the natives; and further that it feeds on ants, worms and other insects, as well as snakes."

In 1819, about sixty years after Brisson's account, Stephens (47) vouchsafes the following information concerning the "Hoatzin Serpent-Eater":

"It inhabits Guiana, and is found on trees near rivers; its food consists of grains and seeds; it will also eat insects and serpents; it has a howling, disagreeable note; its flesh has a very

disagreeable smell (probably caused by the quality of its food) and is consequently not eaten, but is used by the fishermen to catch certain fishes."

Even the writings of recent observers, on the spot, with every opportunity for good observation, are in some instances totally misleading. For example, Penard (34) tells us that Hoatzins run rapidly on the ground, swim well, and "leven in groote troepen van honderden individuen."

PART III—NAME.

Müller (28) called the bird *Phasianus hoazin*, and although it was soon removed from that genus, his specific name still stands accepted. The name hoatzin, hoazin or hoactzin, as it is variously spelled, refers to Hernandez' (22) account, of which Buffon (13) says:

"Its voice is very strong, and it is less a cry than a howl. It is said that it pronounces its name (Hoatzin) apparently in a sad and mournful tone. It is no longer necessary to make it pass with the common people for a bird of ill omen; and since everywhere a great deal of power is assigned to that which is feared, the same people have thought to find in it remedies for the gravest maladies. But it is not said that they feed themselves on it. They abstain from it in fact, perhaps as a result of the same fear, or because of a repugnance founded on the fact that it makes its ordinary food of serpents. It stays usually in the great forests, perched on the trees along the water, for watching and surprising these reptiles. It is found in the hottest parts of Mexico. Hernandez adds that it appears in autumn, so that it is a migratory bird. Mr. Aublet assures me that these birds become tame; that they are sometimes seen in captivity in the houses of the Indians, and that Francois called them Peafowl. They feed their young on ants, worms and other insects."

Much of the charm of this wholly inaccurate and altogether delightful account is lost in the translation from Buffon's native tongue.

The present generic name *Opisthocomus* was given by Stephens (47), referring to the long, waving crest; ὀπισθόκομος, wearing the hair long behind, or, literally, having hair behind. (ὀπισθέν, behind, + κόμπη, the hair).

Ignoring the various bizarre appellations given to this species by writers of the last century, we may review the common names in use to-day.



FIG. 8. Half-grown Hoatzin, Showing Claws on Thumb and First Finger.

Quelch (38) writes twenty years ago "The Hoatzin is known in British Guiana by the various names 'Anna,' 'Hanna,' 'Canje or Stinking Pheasant,' and 'Governor Battenberg's Turkeys'; but in the districts where it is found, the name 'Hannah' is the one most commonly used." In a recent trip to the above mentioned colony, I heard only the name "Canje Pheasant" used, although I discussed the subject with people of many classes.

Among the Portuguese of Brazil the Hoatzin is called *Cigana*, meaning gypsy, and *Catingueiro*, signifying odor of the negro. The Dutch of Cayenne speak of these birds as *Canje Fazanten*, while the more euphonious name of the Venezuelans is *Guacharacas de Agua*. They also call it *Chinchena*, while in Bolivia the Hoatzin is known as "*Loco*," or crazy bird.

PART IV—DISTRIBUTION.

The little we know of its distribution shows that the Hoatzin is as remarkable in this respect as in other phases of its life history. Sharpe (45) gives its range as follows: Amazonia, Guiana, Colombia, Ecuador, Peru and Bolivia. This is very misleading, however, for certain factors enter into the question of inhabitable territory which require more detailed reference.

Penard (34) writing of the birds of Dutch Guiana gives as the local distribution of the Hoatzin, "Wouden en terreinen waar *Arum arborescens* groeit." This is certainly not true as regards

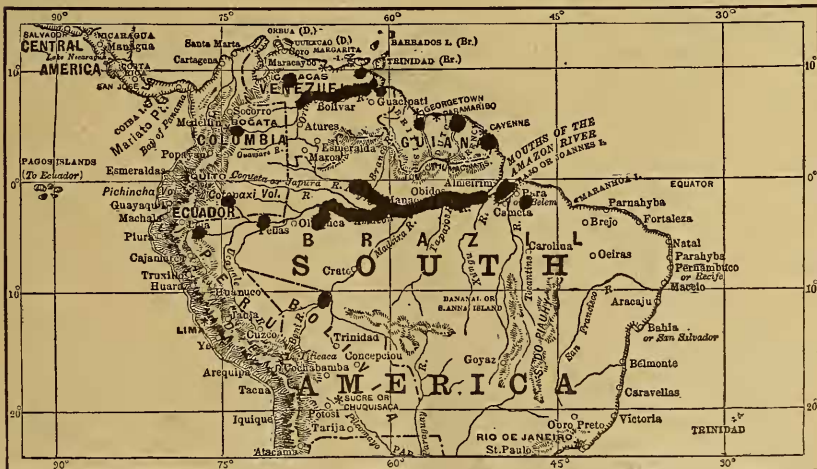


FIG. 9. Distribution of the Hoatzin, as Far as Known.

British Guiana. The great heart-shaped leaves of that Arum are seen along the lower reaches of every coastal river, yet the Hoatzins are confined to three streams, two of which are little more than creeks, in the extreme eastern portion of the colony. These are the Berbice, the Canje and the Abary Rivers.

On the Abary, one has to ascend about twenty miles from the coast before Hoatzins are seen, and from here on they are scattered at irregular intervals for eight or ten miles, confined exclusively to the fringe of bushes on the windward side of the creek. So when we read that the Hoatzin inhabits British Guiana, instead of thinking of it as a bird of strong flight, which traverses savannas and forests, we must realize that it is to be found in only the merest fraction of the colony.

Taking again the large area drained by the rivers just north of the Orinoco delta, one finds Hoatzins absent except on the Rio Guarapiche, beginning two miles below the village of Caño Colorado.

I append a list of the localities from which Hoatzins have been recorded. Their isolated character, while doubtless reflecting our faulty and inadequate knowledge, hints also of the remarkably sporadic occurrence of these birds:

Colombia; Bogata, *Sclater* (40).

Ecuador; Rio Copataza, *C. Buckley*.

Peru; Cashiboya, *Sl. & Sal.* (42).

Yquitos, *Berlepsch* (7).

Bolivia; Lower Beni River, *Allen* (1).

Venezuela; Caño del Toro, *Hornaday* (23).

Orinoco from the delta to Rio Meta, *Cherrie* (16).

Aqua Salada, *Cherrie* (16).

Angostura, *Berlepsch* (7).

Caicara, *Berlepsch and Hartert* (9).

Guarapiche River, *Beebe* (5).

Rio Guanare, *Bingham* (10).

British Guiana; Estuary of Berbice, *Brown* (12).

Berbice, *Sclater* (41), *Quelch* (38).

Abary Creek, *Quelch* (37), *Beebe* (6).

Dutch Guiana; Maroni River, *Perrin* (35).

Indefinite, *Penard* (34).

French Guiana; Approuague, *Berlepsch* (8).

Brazil; The Hoatzin seems to be abundant locally "in the marshy regions which border the Amazon and its tributaries," *Goeldi* (20).

Para, Amazon, Rio Negro, Rio Solimoens, *Astlett* (2).

Amazona inferior, Est. do Amazonas, Rio Juruá, *von Ihering* (25).

Santarem, *Pelzen* (33).

Lower Rio Capim, *Goeldi* (21).

Obidos, *Sclater*.

Marajo Island, Rio Anabiju, *Brigham*.

The lower Amazon may thus be considered as a center of distribution from which the birds have slowly extended northward into the Guianas and the Orinoco region; north-west to Colombia; west to Ecuador and Peru; south-west to Bolivia and south to the various tributaries of this greatest of rivers. Not one of these localities is separated by a real water-shed, and all are in communication with the Amazon, either by direct tributaries, or by marshy *itabos*, or river-joiners.

PART V—GENERAL APPEARANCE.

As far as general appearance goes, the name "Pheasant" is not far amiss when applied to the Hoatzin. It comes closest in general aspect to the chachalacas, but there is something strongly suggestive of a peacock, especially in the carriage of the neck and head. This is well shown in the positions of some of the individuals in Fig. 11.

My descriptions are based on 15 adult Hoatzins from the following localities: Ciudad Bolivar (9); Guarapiche (1); Bogata (1); Bolivia (1); Peru (1); Amazon (1); Abary, British Guiana (1).



FIG. 10. Beak of Hoatzin.

There is apparently no distinguishing sexual character, and remarkably little variation in size. However, the bird which I collected in the Guarapiche, although adult, is distinct from all the others in color, and if these characters should be found to be constant in other individuals, the birds in this isolated locality would form a distinct sub-species.

The beak of the Hoatzin is peculiar in shape, and a better idea can be obtained from the outline drawing, than from the description alone. The mandibles are deep and wide, the average measurements of fifteen specimens being as follows: culmen 29mm., depth of mandibles at gape 22mm., width at gape 19mm. The striking character of the mandible is the shortness of the gonys—this being only about 9mm., or one-fifth of the total length of the mandibles. The mandibles are slaty-olive, lighter on the edges. The nostrils are round, and placed about midway between the eye and the point of the beak. The sides of the head are almost bare, being covered only with a very scanty growth of black, bristle-like feathers on cheeks, ears and lores. Two rows of these function as eye-lashes. The bare skin about the eyes is Nile blue in color, shading into cobalt on the other unfeathered parts of the head. The irides are carmine.

The bristles on the upper lores point upward, their tips interlocking on the forehead. Just back of them begins the long waving crest which is such a marked character of this species. The crown feathers are reddish-buff; in those on the occiput the buff darkens and becomes a shaft stripe, while the edges and tips of the feathers are black. The longest measure about four inches. The feathers of the upper parts as a whole are dark brown, with a distinct olive-green iridescence. The feathers of the nape and neck have pale, buffy shaft-stripes, this color changing to white on the mantle. In some specimens the scapulars are margined with white. The outer edges of the thumb feathers are pale buff, corresponding in shade to the feathers of the chin, throat and breast. Most of the wing coverts are tipped more or less broadly with white, forming three distinct wing bars.

The under wing coverts and primaries are of a rich maroon or chestnut, this hue being duplicated in the feathers of the sides, belly, flanks, and most of the under tail-coverts. The tips of the primaries are olive-green like the back, and the under and upper tail-coverts are black. The tail consists of ten feathers all of which are tipped with a broad band of buffy white.

The Hoatzin harmonizes well with its environment, the dark upper color and the splashes and streaks of white and buff breaking up its body-form into sunlight and shadow. When sitting quietly, either perching or on its nest, it is extremely difficult to detect, and its fear of hawks, shows that this concealment may perhaps serve a useful purpose.

The most interesting thing about its coloration is the way the colors of the under parts are carried out in the wings. The



FIG. 12. Haunt of the Hoatzin, Abary River, British Guiana.



FIG. 13. Nest of Hoatzin in Dense Growth of Mucka-mucka.

pale buffy cream of the breast has spread, as it were, over the broad wrist edge of the wing, and the rich chestnut of the belly has infiltrated through the larger flight feathers. It is most difficult to account for this correlation of limb and body patterns,—a condition found in many reptiles and insects,—but it seems to emphasize the fact that some important environmental factor or cause must be concerned with this apparently directive evolution of just such colors being arranged in just such patterns, on totally different portions of the body.

When the Hoatzin is once alarmed, silhouetted against the sky, with wings and tail spread, and crest waving, no more conspicuous object can be imagined.

The total length of the Hoatzin is about 23 inches; the wing $12\frac{1}{2}$; the tail 12; tarsus 2; middle toe and claw 3.

The single specimen already mentioned which I collected on the Guarapiche, differs from all the other Hoatzins I have examined in having no buff on the crest, this color being replaced by dark reddish chestnut; the buffy cream of the breast is darker, while the edges and shaft lines of the wing-coverts, mantle and scapulars are buff instead of white, and the lower parts instead of maroon are reddish buff. The bird is altogether unlike those from other parts of South America. It is fully adult.

Summing up the Hoatzin as a whole, we have a bird small of body with small head, short, curved beak, long, waving crest, and long, slender neck. The body plumage is loose and disintegrated, the wings and tail large in comparison with the body, and of strong, well-knit feathers,—all the more remarkable when we consider the weak flight, soon to be discussed.

The shortness and stoutness of the beak may safely be correlated with the toughness of its vegetable food. Its short feet rather belie their strength, as the bird seems to have little real power in them, and is forever balancing itself with wings and tail.

PART VI—PARASITES.

The unpleasant odor which characterizes Hoatzins seems to have no effect on their insect parasites, and the cheek bristles are often encrusted with masses of the eggs of several large species of Mallophaga.

No thorough work has been done on the external parasites of this bird, but I obtained three species of Mallophaga from the Hoatzin shot on the Guarapiche River in north-eastern Venezuela. Two of these insects are new species and I have published their descriptions in *Zoologica*, Vol. 1, No. 4. I am in-

debted for their descriptions, and the following most interesting notes, to Dr. Vernon L. Kellogg of Stanford University.

Concerning the *Opisthocomus Mallophaga*, Dr. Kellogg says:

“The three species are:—

1. *Goniocotes curtus* Nitzsch—heretofore taken from *Opisthocomus* and no other host.

2. *Lipeurus*, sp. nov.—in the group *clypeata sutura distincta*, which group has been found heretofore only on maritime birds!

3. *Colpocephalum* sp. nov.—an extraordinarily spiny beast, not much like anything else in the genus.

“I am disappointed in finding these two new species. I hoped to find known parasites that might, by their relationship with other parasites, characteristic of the pheasants or the rails or some other group of birds, be a clue to the indication of your curious bird’s pyletic affinities.

“The one known species of parasite, the *Goniocotes*, belongs to a group of *Mallophaga* best represented, and most characteristically, on the pheasants. But the *Lipeurus*, although a new species, belongs just as unmistakably with a group of *Mallophaga* characteristic of such birds as boobies, albatrosses, cormorants, frigate-birds, pelicans and such strictly maritime forms.”

PART VII—FIELD NOTES IN VENEZUELA.

The first view which Mrs. Beebe and I had of living Hoatzins was two miles up the Rio Guarapiche, in south-eastern Venezuela, where we found a flock of eight on March 27th, 1908. Farther up we discovered three smaller flocks and later in the day a large assemblage of twenty-five individuals. The natives know them by the name of *Guacharacas de Aqua* and are well acquainted with the musky odor which emanates from their bodies. Being considered totally unfit for food, they are never killed and as a result have become extremely unsuspecting.

The following notes were written in the field:

The moment our dug-out comes into view the Hoatzins announce their presence by hoarse, croaking cries; grating and rasping to the ear like an unoiled wheel. Then, as we approach, those nearest flop or crawl inward through the branches, making a tremendous racket. This utterance has been termed a “hissing screech” by some writers and although a very poor description of the sound, no better one comes to mind unless it is a croaking hiss. Buffon (13) tells us “Its voice is very strong, and it is less a cry than a howl.” Queleh (38) says “The cry of the Hoatzin



FIG. 14. Author Photographing Hoatzins.



FIG. 15. Female Hoatzin Flushed from Her Nest; Male Bird Approaching.

is usually heard when they are disturbed, and it is one of which it is not easy to give an exact idea. It recalls slightly the shrill screech of the guinea-bird, (*Numida*), but it is made up of disjointed utterances, like the notes heigh or sheigh (ei as in sleigh), pronounced with a peculiarly sharp and shrill intonation, so as to be quite hiss-like." The reckless way of thrashing through the undergrowth, and the apparent looseness of wing and tail and general carelessness of plumage bring to mind the crazy antics of anis, a fact not wholly uninteresting when we recall certain hints of cuculine structure in the Hoatzin.

Except during the extreme heat of mid-day, the Hoatzins prefer conspicuous positions overhanging the water on mangroves or other trees, among the foliage of which they roost at night. They appear to be extremely sedentary, and day after day we could be sure of finding the birds in the same place. We located nine flocks, ranging from a single pair to forty-two birds in number, and these seemed never to move from their favorite trees except when driven back a few yards into the jungle by our intruding canoe.

In these same trees over the water we found remains of many nests, in various stages of disintegration. As the number of the nests bore a fairly accurate relation to the pairs of birds, and as we saw these large, rough platforms of sticks at no other points, circumstantial evidence would indicate that the sedentary life of these Hoatzins is seasonal, if not, indeed, annual. We were told that they nest in May and June in this locality.

After they flop and clamber a few yards away from the canoe, they all quiet down and with waving crests, crane their necks at us in curiosity from their perches. Each time they utter their grating note, they raise the tail and wings, spreading both widely.

We had no opportunity of observing the quadrupedal habits of the young Hoatzins, but an interesting observation, first noted by Mrs. Beebe, was that this finger or hand-like use of the wing is present in the adults as well. They never fly if they can help it, and even when they pass over firm ground seem never to descend to it. But their method of arboreal locomotion is to push and flop from branch to branch. When the foliage and hanging vines are very thick, they use their wings, either together or alternately, to push aside the obstruction and to keep themselves from falling, until a firm grip has been obtained with the toes. This habit is extremely wearing on the primary feathers which become much frayed from friction against stems and branches.

I secured two specimens for the skin and the skeleton respectively and found them in an interestingly irregular moult. In one (Coll. No. 1138), the right 3rd primary, and the left 4th, 7th and 10th, are about half grown. In the tail, the next to the outer pair and the right central rectrices are in the same stage of growth, while blood feathers are scattered here and there over the body.

The second Hoatzin examined (Coll. No. 1139), was in a still more dishevelled condition of plumage. Both wings and tail were badly frayed and broken. Instead of the full number of ten tail feathers, only five were present, one of which was half grown. Three blood-filled sheaths just appearing above the surface of the skin, represented the remainder. In the right wing, the 2nd, 8th, 18th, 19th and 20th were considerably less than half grown. The head, back and thighs of this individual showed heavy moult, besides many growing feathers over the rest of the body.

The crops of these birds were distended with a finely comminuted mass of bright green vegetable matter, the leaves of the mangroves and some other river growths.

In one crop, scales and the remains of a small fish were also present, and as we once saw a Hoatzin with dripping plumage, creeping from the water up a slanting mangrove root, it may be that the adult birds retain some of the natatory skill which characterizes the nestlings. This, however, is mere conjecture. The scales in this instance were those of the little four-eyed fish (*Anableps anableps*), so common about the muddy shores of the Caños.

PART VIII—FIELD NOTES IN BRITISH GUIANA.

On April 12th, 1909, Mrs. Beebe and I reached a bungalow used as the headquarters of a rice plantation, some twenty miles up the Abary River in British Guiana. Through the kindness of Mr. and Mrs. Lindley Vinton we obtained permission to remain here several days, with excellent opportunities of studying the Hoatzins. Three days after our arrival, Mrs. Beebe had the misfortune to break her arm and we were compelled to leave at once, with only a few notes and photographs. These are, however, of sufficient interest to warrant publication.

The Abary River is, at this point, some twenty yards across, and winds through a great treeless savanna marsh in a general north and south direction. The east bank is for the most part clear of growth except for the reeds and grasses of the savanna. Along the western bank is a dense shrubby or bushy line of vege-



FIG. 16. Female Hoatzin in the Same Position; Male Having Flown Nearer.



FIG. 17. Male Hoatzin Alarmed and About to Take Flight.